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File: USPT

US-PAT-NO: 5232996

DOCUMENT-IDENTIFIER: US 5232996 A

TITLE: Acrylate-terminated polyurethane/epoxy adhesives

DATE-ISSUED: August 3, 1993

INVENTOR-INFORMATION:

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US-CL-CURRENT: 525/452; 525/528, 525/529, 525/920, 528/123

CLAIMS:

What is claimed is:

1. A two-part adhesive composition comprising a Component A and a Component B wherein Component A comprises an epoxy compound having an epoxy equivalency greater than 1 and an acrylate-terminated polyurethane and Component B comprises an aliphatic polyamine containing at least two primary or secondary amine groups.
2. An adhesive composition according to claim 1 wherein the epoxy compound is selected from the group consisting of the polyglycidyl ethers of polyhydric polyols, the polyglycidyl esters of aliphatic or aromatic polycarboxylic acids, and the polyglycidyl ethers of polyphenols.
3. An adhesive composition according to claim 2 wherein the epoxy compound is the polyglycidyl ether of 2,2-bis(4-hydroxyphenyl) propane.
4. An adhesive composition according to claim 1 wherein the acrylate-terminated polyurethane is the reaction product of (a) a polyisocyanate, (b) an active hydrogen-containing material, and (c) an acrylate compound.
5. An adhesive composition according to claim 4 wherein the polyisocyanate is selected from the group consisting of toluene-2,4-diisocyanate, 4,4'-methylene-bis(cyclohexyl isocyanate), and polymethylene polyphenylene isocyanate.
6. An adhesive composition according to claim 5 wherein the isocyanate compound is toluene-2,4-diisocyanate.
7. An adhesive composition according to claim 4 wherein the active hydrogen-containing material is a polyester polyol selected from the group consisting of 1,6-hexane diol-isophthalate diol, 1,6-hexane diol-adipate diol, 1,6-hexane diol-ethylene glycol-adipate diol, and mixtures thereof.
8. An adhesive composition according to claim 4 wherein the active hydrogen-containing material is a poly(alkylene oxide) polyol selected from the

group consisting of poly(propylene oxide) polyols, poly(tetramethylene oxide) polyols, poly(ethylene oxide-propylene oxide) polyols, and poly(ethylene oxide) polyols.

9. An adhesive composition according to claim 8 wherein the poly(alkylene oxide) polyol is poly(propylene oxide) diol or poly(tetramethylene oxide) diol.

10. An adhesive composition according to claim 4 wherein the active hydrogen-containing material is a combination of poly(propylene oxide) diol and 1,6-hexane diol/isophthalate-diol-type polyester polyols in a ratio of former to latter ranging from about 1:3 to 1:4.

11. An adhesive composition according to claim 4 wherein the acrylate compound is selected from the group consisting of 2-hydroxyethyl acrylate, 2-hydroxypropyl acrylate, and a mixture of 2-hydroxyethyl acrylate and a 2-hydroxyethyl acrylate-caprolactone adduct.

12. An adhesive composition according to claim 1 wherein the aliphatic polyamine is a polyalkylene polyamine selected from the group consisting of diethylene triamine, triethylene tetramine, and tetraethylene pentamine.

13. An adhesive composition according to claim 1 wherein Component B comprises a combination of an aliphatic primary polyamine and a polyamide in a ratio of amine functionality to amide functionality ranging from about 1:3 to 1:5.

14. An adhesive composition according to claim 13 wherein the aliphatic polyamine is triethylene tetramine and the polyamide is a polyamide of dimerized linoleic acid.

15. An adhesive composition according to claim 1 wherein the epoxy compound is present in an amount from about 5 to 80 percent by weight and the acrylate-terminated polyurethane is present in an amount from about 5 to 95 percent by weight of the essential components of Component A.

16. An adhesive composition according to claim 15 wherein the epoxy compound is present in an amount from about 20 to 60 percent by weight and the acrylate-terminated polyurethane is present in an amount from about 40 to 80 percent by weight.

17. An adhesive composition according to claim 15 wherein the weight ratio of Component A to Component B is from about 0.5:1 to 10:1.

18. An adhesive composition according to claim 16 wherein the weight ratio of Component A to Component B is from about 0.8:1 to 2:1.

19. An adhesive composition according to claim 1 wherein Component A further comprises a mixture of a polyol and activated silica.

20. An adhesive composition according to claim 19 wherein the polyol is diethylene glycol and the activated silica is fumed silica or colloidal silica.

21. An adhesive composition according to claim 1 wherein Component B further comprises a hydroxy, ring-substituted, aromatic hydrocarbon.

22. An adhesive composition according to claim 21 wherein the hydroxy, ring-substituted, aromatic hydrocarbon is phenol.